

## **SECTION 5**

### **Water Supply Reliability and Water Shortage Contingency Planning**

Section 5 describes the reliability of the water supply and vulnerability to seasonal or climatic shortage and the City's contingency plans in times of supply shortfalls.

#### **5.1 Water Supply Reliability**

The City of Roseville currently supplies surface water for municipal and industrial (M&I) uses. This requires firm surface water contract amounts to ensure that proper supplies are maintained for the residences and businesses relying on the water supply. As described in Section 4, the City maintains surface water supply contracts totaling 66,000 AFY with the USBR, PCWA and SJWD. Contract restrictions on USBR CVP water are enforced during “dry” years and it is assumed that CVP water will be reduced to 75 percent of contracted amount for each water supply scenario. Contract water supplies from PCWA and SJWD are from Middle Fork Project (MFP) water supplies. PCWA has conducted analyses that indicated MFP water is reliable even in drought conditions. Besides the USBR contract stipulation of reductions during dry years, the only other voluntary constraints on the City's current surface water entitlements are contract stipulations based upon terms within the Water Forum Agreement (WFA). WFA restrictions do not apply to specific contracts or entitlements, but are applied to the City's surface water use as a whole. Restrictions are based on the terms as described in Section 4. In summary, the City can divert between 39,800 acre-feet per year and 58,900 acre-feet per year of American River water in “drier” years and 39,800 acre-feet or less in “driest” years as defined in the WFA. Based on over 70 years of historical hydrology of the American River, an analysis was performed as part of the WFA and concluded the City's contract surface water supply would be available pursuant to the City's purveyor-specific WFA. In times of drought and water shortage, the Water Forum analysis also assumed that urban demand would decrease as a result of increased conservation awareness and regulations and surface water supplies would be supplemented with groundwater. It is expected that if the supply were to be reduced due to shortage, consistent with reductions identified in the WFA, existing surface water supply, coupled with conservation, groundwater and continued recycled water use will be sufficient to meet citywide demands. Table 5.1 provides a summary of factors that could result in water supply limitations.

**Table 5.1****Potential factors resulting in inconsistency of supply**

<b>Water supply sources<sup>1</sup></b>	<b>Specific source name, if any</b>	<b>Limitation quantification</b>	<b>Legal</b>	<b>Environmental</b>	<b>Water quality</b>	<b>Climatic</b>	<b>Additional information</b>
Bureau of Reclamation	CVP delivered Folsom Lake	24,000 – 32,000 based on Folsom Unimpaired Inflow	Contract and Water Forum Agreement	None currently identified	None currently identified	Drought	Contract restrictions on CVP water are enforced by the USBR during “dry” years. It is assumed that the CVP water will be reduced by up to 75 percent of contract.
Placer County Water Agency (PCWA)	MFP delivered through Folsom Lake	0 – 50,000 <sup>2</sup> based on Folsom Unimpaired Inflow	Water Forum Agreement	None currently identified	None currently identified	None Considered	Water supply reliability analyses prepared by PCWA on its MFP water supplies conclude that this supply has historically been very reliable, even during drought periods. The conclusions of PCWA analysis is that the MFP can provide 120,000 AFY, even in dry years as severe as what occurred during 1976-1977. As such this water supply is assumed available in all water years.
San Juan Water District (SJWD)	MFP delivered through Folsom Lake	0 – 4,000 based on Folsom Unimpaired Inflow	Water Forum Agreement	None currently identified	None currently identified	Drought	This is a wet year water supply only per the City's contract with SJWD. This water is only available during normal and wet years.
Groundwater	North American River Groundwater Sub-basin	Potential Safe Yield of Groundwater Basin	West Placer Regional Groundwater Management Plan	None currently identified	None currently identified	None Considered	This groundwater system is being managed for emergency and drought contingency reliability. ASR is being developed to further enhance this resource.
Recycled Water	Roseville Regional Wastewater Treatment Facilities	Wastewater Average Dry Weather Flows during month of July	Recycled Water permit requirements	None currently identified	None currently identified	Facility design may limit some users for winter use periods	Recycled water is available in all year types. Short term supply shortages could result from potential wastewater treatment plant disruptions. In the event of a disruption, potable water is utilized as a back up supply if needed.

<sup>1</sup>Water Forum Agreement is a voluntary memorandum of understanding signed by the City of Roseville

<sup>2</sup>Includes 30,000AF contract water as well as 20,000AF Re-operation water as identified in the Water Forum Agreement

The City's water system is completely "on-demand", as is typical of many urban water systems. During normal years, water supplies from Folsom Lake are sufficient to meet the contractual obligations, and the City has sufficient quantities, either directly from USBR or wheeled through Folsom Lake from PCWA, to meet the needs of the community. During times of drought, water allocations may be reduced, resulting in restrictions on all water used within the City. The City has developed policies to address the potential of water shortages as described below.

## **5.2 Water Quality Constraints**

Water quality affects the City's water management strategies through the City's efforts to be in compliance with Federal and State regulations. These regulations require rigorous water quality testing, source assessments, and treatment compliance. Water quality issues are not anticipated to have significant impact on water supply reliability for the City's water supply sources. At this time, there are no known surface water quality issues that could impact availability or reliability. Surface water will continue to be treated to drinking water standards, and no raw water quality deficiencies are foreseen to occur in the next 25 years.

Groundwater quality data shows groundwater within the City to meet or exceed potable drinking water standards. It is assumed that any localized groundwater contamination can be isolated and/or mitigated by constructing new treatment facilities for treatment prior to delivery into the water distribution system. No groundwater treatment systems are currently utilized nor are planned. All groundwater supplies currently meet or exceed current drinking water standards, including secondary standards regulated for aesthetic qualities. Iron and manganese are two metals that occur naturally within the geological formations from which the groundwater is extracted, and are known to be at elevated levels in wells of surrounding water systems. The City does not anticipate that iron and/or manganese will impact their groundwater supply quality or availability.

The City is currently applying for permits from the State for implementing aquifer storage and recover (ASR). ASR would allow for the injection of treated drinking water into the groundwater basin for withdrawal at a later time. The City does not anticipate that ASR operations will adversely impact the groundwater quality and in some instances may increase the aesthetic qualities of the water produced. If permitted, the City will conduct the required water quality testing as defined by the State. No other special water management strategies due to water quality are anticipated.

Recycled water supplies are generated from tertiary treated wastewater meeting Title 22 requirements for full unrestricted use. There are no currently known recycled water quality issues that could impact availability of this supply source. The City will continue to conduct required recycled water quality testing as required to meet Title 22 standards. No other special water management strategies due to water quality are anticipated, as referenced in Table 5.2.

<b>Table 5.2</b> <b>Water quality — current and projected water supply impacts (AFY)</b>							
<b>Water source</b>	<b>Description of condition</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035 - opt</b>
Surface Water	No water quality issues known or anticipated	0	0	0	0	0	0
Groundwater	No water quality issues known or anticipated	0	0	0	0	0	0
Recycled Water	Meets Title 22 requirements for full unrestricted use	0	0	0	0	0	0

### 5.3 Water Shortage Contingency Planning

Based on historical information, current water supplies, and projected supply availability, the City does not anticipate having more than a 25-percent shortage over a three-year consecutive dry-year period. However, as part of this UWMP, the City has considered possibilities of shortage and outages that could affect water supply. Water shortage contingency planning includes actions to be implemented during a catastrophic interruption of water supplies including but not limited to regional power outage, earthquake, fire, flooding or other disasters. The City's shortage contingency plan notes that long-duration shortages are handled through implementation of a drought contingency plan, and short-term disruptions are addressed through use of existing water system storage and water system interties with adjacent jurisdictions. In the event these supplies are not sufficient or available to meet short-term needs, groundwater will be used to supplement water demands. The Water and Energy Conservation component of the City of Roseville General Plan encourages resource conservation and protection, and the City provides a comprehensive program to encourage conservation. The City has implemented various strategies and plans to minimize the use of potable water in order to operate effectively under drought conditions.

In 1991, the City developed and adopted the Roseville Water Conservation and Drought Mitigation Ordinance. Under this ordinance, the City has authority to declare water shortage conditions and implement drought related mitigation measures. The City can initiate this process by declaring a drought stage (Stage One through Stage Five) and imposing the appropriate and corresponding drought response measures. For example, Stage One prohibits washing of streets, driveways, sidewalks, and parking lots and places restrictions on vehicle washing, and serving water in restaurants. Under Stage Two, additional measures on landscape irrigation would be imposed. Depending on the severity during Stage Three, Four, and Five drought restrictions the use of groundwater could also be initiated. Stages One through Five, as outlined in the City's Municipal Code Chapter 14.09, cover supply shortages up to 50 percent. Current water shortage contingency measures can be found in Appendix H. In an effort to achieve regional consistency with measures and drought messaging, the City is considering modification of the measures, determinations and declarations associated with water shortages. At this time language is being considered but has not been adopted. Measures included, however, will still address shortages of up to 50 percent.

In February 2008 the City of Roseville adopted Ordinance 4629, which added Sections 14.09.200-14.09.220 and amended Sections 14.09.020 – 14.09.110 of the Roseville Municipal Code regarding water conservation. The purpose of the ordinance is to ensure compliance with all federal, state and local requirements relating to water conservation and drought mitigation by:

- Reducing water consumption throughout the City during years of normal precipitation and during years of drought;
- Protecting and conserving the City's supply of water during times of emergency and/or crisis; and
- Minimizing and/or eliminating the waste through voluntary compliance or punitive action, if necessary.

By way of example, on April 30, 2008, the City of Roseville's Environmental Utilities Department activated a Stage One Water Conservation Level within the Roseville City limits in response to a letter received from the United States Bureau of Reclamation (USBR) which reduced Roseville's water supply for the 2008 calendar year by 25 percent. On February 20, 2009 the drought stage was increased to a Stage Two Water Conservation Level in response to a declaration by the California Governor for measures to result in a 20 percent savings. This stage remained until

October of 2010 when the drought order was rescinded due to sufficient water supply conditions. Mandatory water use prohibitions per the City's ordinance are outlined in Table 5.3 below. The ordinance text can be found in Appendix J.

Table 5.3	
Water shortage contingency — mandatory prohibitions	
Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
<p>A. Water shall be confined to the user's property and shall not be allowed to runoff to adjoining properties, or to the roadside or to the gutter. Care shall be taken not to water past the point of saturation.</p> <p>B. Free-flowing hoses for all uses are prohibited. Automatic shut-off devices shall be attached on any hose or filling apparatus in use.</p> <p>C. Leaking pipes or faulty sprinklers shall be repaired within five calendar days or less if warranted by the severity of the problem as determined in the discretion of the director or his or her designee.</p> <p>D. All pools, spas, and ornamental fountains/ponds shall be equipped with a recirculation pump and shall be constructed to be leak-proof. Pool draining and refilling shall be allowed only to the extent required for health, maintenance, or structural considerations, and must otherwise comply with all applicable federal, state and local stormwater management program requirements, including, but not limited to, the urban stormwater quality management and discharge control ordinance set forth in the City of Roseville Municipal Code.</p> <p>E. Landscaping.</p> <p>1. All landscaping installed in the City of Roseville shall comply with the water efficient landscape requirements adopted by resolution of the city council.</p> <p>2. This section shall not apply to landscaping installed for single-family homes, except for developer-installed landscaping, or to landscaping for cemeteries.</p> <p>F. Water Reclamation. All site reviews shall include an evaluation of water reclamation and recycling, and use of reclaimed water from the city shall be required if economically feasible.</p>	<p><b>Basic Stage:</b> During the basic water conservation stage water shall be used for beneficial purposes only with all unnecessary and wasteful uses of water are prohibited.</p>
<p>A. All basic stage restrictions shall continue in place, except to the extent they are replaced by more restrictive conditions imposed by this section.</p> <p>B. All city users are to reduce water use by 10 percent.</p> <p>C. Washing streets, parking lots, driveways, sidewalks or buildings, except as necessary for health or sanitary purposes, is prohibited.</p> <p>D. Restaurants. Water shall not be served at restaurants except by request.</p> <p>E. Water shortage surcharges shall be implemented as set forth in Roseville Municipal Code Section 14.08.095.</p>	<p><b>Stage One:</b> City's water supply is adequate to meet 90 percent of projected demands</p>
<p>All basic stage and stage one restrictions required shall continue in place, except to the extent they are replaced by more restrictive conditions imposed by this section.</p> <p>B. Residential users shall reduce water usage by 20 percent.</p> <p>C. Nonresidential users (including without limitation, commercial,</p>	<p><b>Stage Two:</b> City's water supply is adequate to meet 80</p>

<p>industrial, church and publicly-owned users) shall reduce irrigation by 30 percent for existing landscaping.</p> <p>D. Washing of vehicles or boats is prohibited except:</p> <p>1. When using a hose that is equipped with a control nozzle capable of completely shutting off the flow of water except when positive action or pressure to maintain the flow of water is applied, or</p> <p>2. When washed in either an automatic or manual commercial car wash. This exemption does not apply to temporary car washes, held for fundraising purposes, or to any car wash in which the water is applied via a hand held garden type (non-pressure) hose.</p> <p>E. Water shortage surcharges and excess water use charges shall be implemented as set forth in Roseville Municipal Code Section 14.08.095.</p>	<p>percent of projected demands</p>
<p>All basic stage, stage one and stage two restrictions required shall continue in place, except to the extent they are replaced by more restrictive conditions imposed by this section.</p> <p>B. Residential users are to reduce water usage by 30 percent.</p> <p>C. Nonresidential users (including without limitation, commercial, industrial, church, and publicly owned users) shall reduce irrigation by 50 percent for existing landscaping.</p> <p>D. New or expanded landscaping is limited to drought-tolerant trees, shrubs, and ground-cover. No new turf or grass shall be planted, hydroseeded, or laid.</p> <p>E. Except where reclaimed water is used, golf course fairways shall not be watered. One-half of the turf areas in all city parks and median strips shall not be watered.</p> <p>F. All decorative fountains, decorative pools (i.e., non-swimming), and decorative waterways shall be drained and made dry. Such fountains, pools, and waterways shall not be refilled until the city has returned to the basic water conservation stage.</p> <p>G. Construction Water. Except where reclaimed water is used, use of water for dust control shall be augmented by hardened, temporary travel routes. Non potable water shall be used to the greatest extent possible.</p> <p>H. Swimming Pools. If drained, such swimming pools shall not be refilled until the city has returned to the basic water conservation stage.</p> <p>I. Water shortage surcharges and excess water use charges shall be implemented as set forth in Roseville Municipal Code Section 14.08.095.</p>	<p><b>Stage Three:</b> City's water supply is adequate to meet 70 percent of projected demands</p>
<p>All basic stage, stage one, stage two, and stage three restrictions required shall continue in place, except to the extent they are replaced by more restrictive conditions imposed by this section.</p> <p>B. Residential customers are to reduce water usage by 40 percent.</p> <p>C. All nonresidential users (including without limitation, commercial, industrial, church, and publicly-owned users) shall reduce irrigation by 75 percent for existing landscaping.</p> <p>D. Installation of any new landscaping is prohibited.</p> <p>E. Automobiles or equipment shall be washed only at commercial establishments that use recycled water.</p> <p>F. No commitments shall be made to provide service for new water service connections until the city has returned to a stage two drought restriction.</p> <p>G. Except where recycled water is used, no turf in city parks or medians shall be irrigated.</p> <p>H. Construction Water. Except where recycled or other non-potable</p>	<p><b>Stage Four:</b> City's water supply is adequate to meet 60 percent of projected demands</p>

water is used, use of water for dust control is prohibited. I. Swimming Pools. Filling pools and spas is prohibited. J. Water shortage surcharges and excess water use charges shall be implemented as set forth in Roseville Municipal Code Section 14.08.095.	
A. All basic stage, or stage one, stage two, stage three and stage four restrictions required shall continue in place, except to the extent they are replaced by more restrictive conditions imposed by this section. B. Residential users are to reduce water usage by 50 percent. C. Except where recycled water is used, turf or grass shall not be irrigated. No persons shall irrigate any landscaping except a tree, shrub, or drought-tolerant groundcover. No irrigation shall be done except by handheld hose equipped with a nozzle capable of completely shutting off the flow of water except when positive action or pressure to maintain the flow of water is applied. D. Water shortage surcharges and excess water use charges shall be implemented as set forth in Roseville Municipal Code Section 14.08.095.	<b>Stage Five:</b> City's water supply is adequate to meet 50 percent of projected demands

Additionally, the City completed an update to the water efficient landscape requirements to include new water conservation and management provisions. This update was prepared in compliance with the Water Conservation in Landscaping Act of 2006 (AB 1881). The old requirements were updated with the new Water Efficient Landscape requirements and were adopted by the City Council on November 4, 2009 (Ord. No. 4786).

Table 5.4 outlines the actions the City will undertake during water shortages to increase efficiency messaging and support water supply reductions during staged water conservation efforts.

<b>Table 5.4</b>		
<b>Water shortage contingency — consumption reduction methods</b>		
<b>Consumption Reduction Methods</b>	<b>Stage When Method Takes Effect</b>	<b>Projected Reduction (%)</b>
Multi-Media Public Outreach	All stages	20%
Water Waste Patrols and Customer Education	All stages	
Landscape Water Restrictions	Stage 2 - 5	Result of all actions estimate savings up to 50%
Landscape Installation Restrictions	Stage 3 - 5	
Decorative Fountain and pool reductions and restrictions	Stage 3 - 5	
Request for Residential and Commercial water use reductions	Stage 1 - 5	

Roseville anticipates that when agencies rely on volumetric based water billing that conservation cutbacks can impact revenues required for Utility operations. In an effort to stabilize revenues in times of shortage, the City has incorporated measures to deal with revenue shortfall as well as



provide additional price signals to users in the highest use brackets. During water shortages a temporary increase in water rates occurs depending on the severity and duration of the shortage. During the first year it is assumed there is a reserve fund that can be utilized to offset full increases which would occur on the second and subsequent years of a shortage conditions. Rate structures are set so that if customers meet the requested cutback (i.e. 10%, 20%, etc) they would not see an increase in their typical water bill. If they did not achieve the requested savings then water service would result in higher bills. In addition to rate stabilization the rate structure also includes penalty rates for the highest residential use customers. Depending on the shortage conditions the top two tiers will be assessed and surcharged to send an additional price signal to customers in this use category. If water use reductions were made consistent with requested need customers would not be in the highest use categories and hence not be subject to higher water bills. These water shortage consistency measures are identified in Table 5.5.

<b>Table 5.5</b>		
<b>Water shortage contingency — penalties and charges – RMC 14.08.095</b>		
<b>Penalties or Charges</b>	<b>Stage When Measure Takes Effect</b>	<b>Measure Description</b>
Water Shortage Surcharge	Stage 2 - 5	A temporary increase in per unit water rates to stabilize water revenues when customers are successful in reducing water demands.
Excess Water Use Charge	Stage 3 - 5	A temporary increase in the top tiers of water use to provide further incentives for users in these categories to find ways of reducing demands.

Copies of the City's ordinances related to water shortage contingences such as conservation requirements and excess water use surcharges are included in Attachment G.

#### **5.4 Drought Planning**

This section describes the reliability of the City's water supply and vulnerability to seasonal or climactic shortages for various water year types. The water type years are defined as follows:

- Average Year (or Normal year) - a year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every ten years.
- Single-dry year - generally considered to be the lowest annual runoff for a watershed since

the water year beginning in 1903.

- Multiple-dry year period - generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903.

To determine each year type the City reviewed data supplied by the Department of Water Resources for the American River at Folsom (AMF) Station between the years of 1901 and 2010. The unimpaired inflow, defined as the March through November flows, for each year was used to determine the base years. Table 5.6 summarizes the base years used for defining each water year and Table 5.7, provides the actual data used for the dry year types as compared against the average water year.

<b>Table 5.6</b> <b>Basis of water year data</b>	
<b>Water Year Type</b>	<b>Base Year(s)</b>
<b>Average Water Year</b>	1901 through 2010 (110 years)
<b>Single-Dry Water Year</b>	1977
<b>Multiple-Dry Water Years</b>	1990 through 1992 (3 years)

<b>Table 5.7</b> <b>Supply reliability — historic conditions</b>					
	<b>Single Dry Water Year 1977 (AFY)</b>	<b>Multiple Dry Water Years (AFY)</b>			
		<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Average of 3 Years<sup>1</sup></b>
Folsom Reservoir Unimpaired Inflow Average Year = 1,886,210 AF Roseville Surface Water Available Average Year = 58,900 AF <sup>2</sup>					
Unimpaired Inflow	289,740	822,331	1,185,926	604,927	871,061
Percent of UI Average Year:	15.4%	43.6%	62.9%	32.1%	46.2%
Surface Water Allocation	39,800	54,466	58,900	46,917	56,159
Percent of Available Average Year Supply	67.6%	92.7%	100%	79.7%	95.3%

<sup>1</sup>Average available surface water for the 3 years is based upon the average of the unimpaired inflow value.

<sup>2</sup>Available surface water supplies are based upon the City's Water Forum Agreement and the allocation of supplies are based on unimpaired inflow.

#### 5.4.1 Stages of Action

The City's Municipal Code allows the City to implement up to 5 stages for conservation as detailed in Section 5.3 and Table 5.3 above. These stages and associated actions are planned for use not only

for water shortages caused by emergencies but also to address water supply reductions as a result of drought. Each water conservation stage is estimated to yield a ten percent reduction in surface water supply needs. The following table, Table 5.8, outlines the water supply conditions that would trigger each conservation stage. The City plans on mitigating surface water shortages with use of groundwater, conservation and expansion of recycled water, as available. Per the Roseville Municipal Code 14.090.050, however, groundwater cannot be used until surface water shortages would result in greater than 20% shortage which would trigger Stage 3 drought conditions. Groundwater cannot be used to decrease drought conditions to lower than Stage 2 conditions.

<b>Table 5.8</b>		
<b>Water shortage contingency — rationing stages to address water supply shortages</b>		
<b>Stage No.</b>	<b>Water Supply Conditions</b>	<b>% Shortage</b>
Basic Stage	Full surface water supply allocation of 58,900 AF <sup>1</sup>	0%
Stage 1	Surface water supply availability of 53,000 AF	10%
Stage 2	Surface water supply availability of 47,120 AF	20%
Stage 3	Total water supply availability of 41,230 AF	30%
Stage 4	Total water supply availability of 35,340 AF <sup>2</sup>	40%
Stage 5	Total water supply availability of 29,450 AF <sup>2</sup>	50%

<sup>1</sup> Surface water availability consistent with Water Forum Agreement for water taken from the American River system.

<sup>2</sup> Based on water supply portfolio available it is not projected or anticipated that shortages would ever get to levels of 40 – 50% shortage. Measures are planned, however, to meet regulatory requirements or UWMP.

Pursuant to the City's Water Forum Agreement, the City has assumed it is limited to no less than 39,800 AFY of surface water supplies in the driest of year types although conference years, when unimpaired inflow to Folsom is below 400,000 AFA, may result in further reductions. This represents a 32.4% reduction in average year water supplies of 58,900 AFY. The City has planned groundwater resources to meet the needs of the community so that supply conditions are not anticipated to require conservation reductions greater than 20%. In the event conference years require additional reductions in water supplies then increased conservation measures and additional groundwater use would be considered to make up for the shortage.

Table 5.9 provides an estimate of water resources available for each of the next 3 water years based on the driest 3 year historic sequence for the City's water supply, as described in Tables 5.6 and 5.7 above. For the three year series, it is assumed the USBR Central Valley Project (CVP) contract water will be reduced 25% in the first year; CVP water will be fully available in the second year and will be reduced 50% in the third year. PCWA water is however assumed to be available in all three years. Because the City's contract with SJWD is for normal year supplies, the supply is assumed not

available during the three year series. Recycled water is available in all year types to offset portions of the City's irrigation water demand. For normal years, recycled water supplies are estimated to equal the amount of demand used in 2010 and for the three consecutive years is estimated to increase slightly each year as new irrigation demands are added as a result of new recycled water service connections but this increase in supply is not reflected in Table 5.9 as a more conservative approach was used. Groundwater is not shown within Table 5.9 as it is only used by the City as a backup supply to supplement water supplies if necessary to meet demands. For this planning phase and current system demands it is not anticipated that drought shortages will exist. Roseville has, in the past, declared drought conditions and called for reduction measures as a result of statewide conditions and to provide consistency in messaging in the region.

<b>Table 5.9</b>				
<b>Supply reliability — current water sources (AFY)</b>				
<b>Water supply sources<sup>1</sup></b>	<b>Average / Normal Water Year Supply<sup>2</sup></b>	<b>Multiple Dry Water Year Supply<sup>2</sup></b>		
		<b>Year 2011</b>	<b>Year 2012</b>	<b>Year 2013</b>
Bureau of Reclamation	32,000	24,000	32,000	16,000
Placer County Water Agency (PCWA) <sup>5</sup>	30,000	30,000	30,000	30,000
San Juan Water District (SJWD)	4,000	0	0	0
Recycled Water <sup>3</sup>	1,709	1,709	1,709	1,709
<b>Total</b>	<b>67,709<sup>4</sup></b>	<b>55,709</b>	<b>63,709</b>	<b>47,709</b>
<b>Percent of normal year:</b>	<b>100%</b>	<b>82.3%</b>	<b>94.1%</b>	<b>70.5%</b>

<sup>1</sup>From Table 4.1.

<sup>2</sup>See Table 5.6 for basis of water type years.

<sup>3</sup>As a conservative estimate current recycled water use estimated for all years.

<sup>4</sup>Total contract water available in normal water years. Does not account for Water Forum commitment of 54,800. See section 4.1.1 for total surface water supply sources.

<sup>5</sup>Although PCWA contract water not scheduled and paid for until needed full contract amounts are available on a temporary basis in the event of shortages in other supplies.

#### 5.4.2 Saving Verification

Determination of water savings is always a challenge due to the variables involved. In shortage conditions it follows that “normal” water use would tend to increase due to climatic conditions while measures are implemented to result in an overall reduction in water use. As a result, the method for tracking of success will be based on continuous monitoring of information available. Measures anticipated include:

- Monthly review of total water production into the system
- Per customer water use comparison to same period of previous year or unconstrained condition. This may be a challenge based on changed ownership but can be used to determine outliers and non-compliance that would warrant individual follow-up.
- Monitoring of individual landscape budgets established for dedicated irrigation accounts. Although these are not currently used for billing purposes they can be used for comparative analysis.

In all metrics it will be necessary to determine methods for normalizing to then current conditions which will be an ongoing effort for reporting. This will be an ongoing process required during times of shortage.

## 5.5 Reliability Assessment

The following section summarizes the reliability of City water supplies during normal, dry and multiple dry water years.

### Normal Year Assessment

Normal year supplies versus water demand targets over the next 20 years are compared in Table 5.10 below. Normal wet year supplies are comprised of surface water supplies from USBR, PCWA and SJWD as well as recycled water used for some irrigation demands within the City. As shown in Table 5.10, the City's normal year water supplies exceed target water demands over the next 20 years.

<b>Table 5.10</b>					
<b>Supply and demand comparison — normal year (AFY)</b>					
	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035 - opt</b>
<b>Supply totals (Table 4.1)</b>	53,197	58,670	68,980	69,397	69,770
<b>Target demand totals (Table 3.11a)</b>	39,423	41,101	48,611	50,464	51,610
<b>Difference</b>	13,774	17,869	20,369	18,933	18,160
Difference as % of Supply	25.9%	30.5%	29.5%	27.3%	26.0%
Difference as % of Demand	34.9%	43.5%	41.9%	37.5%	35.2%

### Single Dry and Multiple Dry Year Assessments

In dry years the City of Roseville's water supplies are reduced as compared to normal water years surface water supply limitations and cut-backs set forth in water supply contracts. During dry and multiple dry year conditions, the City plans to reduce water demands through staged conservation efforts allowed under the City's Municipal Code to meet the City's Water Forum Agreement commitments which require reduced diversions from the American River during dry and critically dry years. A 20% demand reduction achieved through implementation of up to a Stage 2 level of conservation is assumed to conservatively plan for water supplies during a single dry year event. Based on historical data, multiple dry years results in more water availability and surface water supplies are not as limited as during a single dry year. In these conditions the City will initiate a voluntary conservation request to its water customers reduce 10% in their usage. This is consistent with regional approaches that are being coordinated to educate customers and prepare for potential future shortages.

Single dry year supplies versus water demand targets over the next 20 years are compared in Table 5.11 below. In a single-dry year, it is anticipated the City's surface water supplies would be reduced to their lowest available level of 39,800 AFY per the City's Water Forum Agreement. Water demands will be met through available surface water supplies, recycled water supplies and groundwater if needed to supplement supplies. As previously noted, recycled water supplies are still available at the same level as available during normal years. It is important to note that the water demands shown are target water demands. Should implementation of demand reduction measures not reduce total water demands to the target levels, demands are expected to be greater (reference Table 3.11b for estimates based on current water demands). Should demand targets not be met, groundwater would be utilized to supplement surface water and recycled water supplies. As shown in Table 5.11, if target demands can be met, supplemental groundwater supplies are not required.

Table 5.11 Supply and demand comparison — single dry year (AFY)					
	2015	2020	2025	2030	2035 - opt
<b>Supply:</b>					
Surface Water	39,800	39,800	39,800	39,800	39,800
Recycled Water	2,197	2,670	2,980	3,397	3,770
Groundwater	0	0	0	0	0
<b>Supply total</b>	<b>41,997</b>	<b>42,470</b>	<b>42,780</b>	<b>43,197</b>	<b>43,570</b>
<b>Demand:</b>					
Target Demand	39,423	41,101	48,611	50,464	51,610
Drought Stage Demand Reduction (20%) <sup>1</sup>	(7,445)	(7,686)	(9,126)	(9,413)	(9,568)
<b>Target demand total</b>	<b>31,978</b>	<b>33,415</b>	<b>39,485</b>	<b>41,051</b>	<b>42,042</b>
<b>Difference</b>	10,019	9,055	3,295	2,146	1,528
Difference as % of Supply	23.9%	21.3 %	7.7 %	5.0 %	3.5 %
Difference as % of Demand	31.3 %	27.1 %	8.3%	5.2%	3.6 %

<sup>1</sup> Demand reduction is 20% of surface water needs because recycled water is available in all year types and is not subject to conservation efforts so recycled water supply is first subtracted from the target demand. For example for 2015: (40,337 – 2,197) X 20% = 7,628.

Multiple dry year supplies versus water demand targets over the next 20 years are compared in Table 5.12 below. In each of the multiple dry year scenarios, it is anticipated the City's surface water supplies would be reduced to the same level as outlined in Table 5.9 above. As is the City's practice, water demands will be met through available surface water supplies, recycled water supplies and groundwater if needed to supplement supplies. As previously noted, recycled water supplies are available at the same level as during normal years. It is important to note that the water demands shown are target water demands. Should implementation of demand reduction measures not reduce total water demands to the target levels, demands are expected to be greater (reference Table 3.11b for estimates based on current water demands). Should demand targets not be met, groundwater would be utilized to supplement surface water and recycled water supplies. As shown in Table 5.12, if target demands can be met, supplemental groundwater supplies are not required.

**Table 5.12**  
**Supply and demand comparison — multiple dry-year events (AFY)**

		2015	2020	2025	2030	2035 - opt
Multiple-dry year first year supply	<b>Supply:</b>					
	Surface Water	54,000	54,000	54,000	54,000	54,000
	Recycled Water	2,197	2,670	2,980	3,397	3,770
	Groundwater	0	0	0	0	0
	<b>Supply total</b>	<b>56,197</b>	<b>56,670</b>	<b>56,980</b>	<b>57,397</b>	<b>57,770</b>
	<b>Demand:</b>					
	Target Demand	39,423	40,111	47,510	49,334	50,453
	Drought Stage Demand Reduction (10%) <sup>1</sup>	(3,723)	(3,744)	(4,453)	(4,594)	(4,668)
	<b>Target demand total:</b>	<b>35,700</b>	<b>36,367</b>	<b>43,057</b>	<b>44,740</b>	<b>45,785</b>
	<b>Difference</b>	20,497	20,303	13,923	12,657	11,985
	Difference as % of Supply	36.5%	35.8%	24.4%	22.1%	20.7%
	Difference as % of Demand	57.4%	55.8%	32.3%	28.3%	26.2%
Multiple-dry year second year supply		2015	2020	2025	2030	2035 - opt
	<b>Supply:</b>					
	Surface Water	62,000	62,000	62,000	62,000	62,000
	Recycled Water	2,197	2,670	2,980	3,397	3,770
	Groundwater	0	0	0	0	0
	<b>Supply total</b>	<b>64,197</b>	<b>64,670</b>	<b>64,980</b>	<b>65,397</b>	<b>65,770</b>
	<b>Demand:</b>					
	Target Demand	39,423	40,111	47,510	49,334	50,453
	Drought Stage Demand Reduction (10%) <sup>1</sup>	(3,723)	(3,744)	(4,453)	(4,594)	(4,668)
	<b>Target demand total:</b>	<b>35,700</b>	<b>36,367</b>	<b>43,057</b>	<b>44,740</b>	<b>45,785</b>
	<b>Difference</b>	28,497	28,303	21,923	20,657	19,985
	Difference as % of Supply	44.4%	43.8%	33.7%	31.6%	30.4%
	Difference as % of Demand	79.8%	77.8%	50.9%	46.2%	43.6%
Multiple-dry year third year supply		2015	2020	2025	2030	2035 - opt
	<b>Supply:</b>					
	Surface Water	46,000	46,000	46,000	46,000	46,000
	Recycled Water	2,197	2,670	2,980	3,397	3,770
	Groundwater	0	0	0	0	0
	<b>Supply total</b>	<b>48,197</b>	<b>48,670</b>	<b>48,980</b>	<b>49,397</b>	<b>49,770</b>
	<b>Demand:</b>					
	Target Demand	39,423	40,111	47,510	49,334	50,453
	Drought Stage Demand Reduction (10%) <sup>1</sup>	(3,723)	(3,744)	(4,453)	(4,594)	(4,668)



	<b>Target demand total:</b>	<b>35,700</b>	<b>36,367</b>	<b>43,057</b>	<b>44,740</b>	<b>45,785</b>
	<b>Difference</b>	12,497	12,303	5,923	4,657	3,985
	Difference as % of Supply	25.9%	25.3%	12.1%	9.2%	8.0%
	Difference as % of Demand	35.0%	33.8%	13.8%	10.4%	8.7%

<sup>1</sup>Demand reduction is 10% of surface water needs because recycled water is available in all year types and is not subject to conservation efforts so recycled water supply is first subtracted from the target demand. For example for 2015, first year supply:  $(39,423 - 2,197) \times 10\% = 3,723$ .